



Do's and Don'ts for Keeping Lab Notebooks

A laboratory notebook is a vital record of events leading to repeatable results. The recorded information can establish dates of conception and procedure leading to the results. The laboratory notebook establishes a procedure that can be repeated and proven valid by an outside participant. Below are fourteen rules you should follow when keeping lab notebooks.

#1 – Do use bound books

Scientists should use permanently bound notebooks, e.g. notebooks with spiral, glue, or sewn bindings. If loose-leaf sheets are used, they should be consecutively numbered and each page should be dated, signed, and witnessed.

#2 – Do sign and date

Each notebook should be signed and dated on the inside front cover to indicate the first day the recipient started using the notebook. Each entry should be dated and signed or initialed.

An independent witness, i.e. someone who understands the science but will not be named as a co-creator of the results, should sign and date each entry after the statement: “Read and understood by _____.” (The witness should preferably sign the entries on a contemporaneous or fairly contemporaneous basis, but entries can also be reviewed, signed, and dated on a periodic, e.g. weekly or monthly, basis.)

#3 – Do use ink

Notebook entries should be made in ink and in chronological order. Entries should not be erased or “whited out.” If an entry contains an error, a line should be drawn through the error and new text should continue in the next available space.

#4 – Don't leave blank spaces

Blank gaps between entries should be avoided. If a blank space is left on a page, a line or cross should be drawn through the blank space, initialed, and the page dated to prevent subsequent entries.

#5 – Don't modify

Prior entries should not be modified at a later date. If data were omitted, the new data can be entered under a new date and cross-referenced to the previous entry. Record experiments when they are performed. Date each entry, even if it continues a single experiment.

#6 – Do use past tense

Use the past tense (e.g. “*was heated*”) to describe the experiments that were actually performed.

#7 – Do explain abbreviations and special terms

Explain all abbreviations and terms that are nonstandard. Explain in context, in a table of abbreviations, or in a glossary.

#8 – Do staple attachments

Attachments such as graphs or computer printouts should be permanently attached to pages in the notebook (e.g. by stapling), and both the attachment and the notebook signed and dated (over an edge, so that if the attachment falls out, it is visible and can be matched back to the correct page). If the attachment cannot be stapled, it should be placed in an envelope and the envelope stapled to the notebook page. The envelope and page should then be signed and dated and witnessed making reference to the attachment being placed in the envelope.

#9 – Don't remove originals

No originals should ever be removed from the notebook.

#10 – Do outline new experiments

When a new project or experiment is started, the objective and rationale should be briefly outlined (e.g. in a short paragraph or by providing a flowchart).

#11 – Do record lab meeting discussions

Relevant discussions from lab meetings (i.e. with your lab partner or as a class) should be recorded as ideas or suggestions made by others. The names of the people making the suggestions should be carefully documented. This information may be important in proving the validity and publishability of your experiment.

#12 – Do provide detail

Record test descriptions, including preferred operating conditions, control conditions, operable and preferred ranges of conditions, and alternate specific materials. Also, record test results and an explanation of the results as well as photos and sketches of the results. Any conclusions should be short and supported by factual data. Opinions or speculation about the results should be avoided.

#13 – Do track notebooks

Ideally, each lab should maintain a catalog of notebooks in which each notebook is assigned a number, and the name of the author of each notebook is recorded. In addition, the date the author received the notebook as well as the date the notebook was completed and returned should be recorded. Upon leaving the lab, the author should return all notebooks checked out to him.

#14 – Do save completed notebooks

All completed notebooks should be indexed (e.g. by number, by author, and/or by subject area) and kept safely in a central repository. Lab notebooks may be referenced for years after completion to establish validity of the experiment or as a starting point for a new experiment.

Adapted from Fasse, J. Peter; *Intellectual property, complex litigation, technology law*; Fish & Richardson P.C.

Lab Report Format

Cover Page

- Title
- Exercise number
- Date
- Due Date
- Name
- Lab Partner

Objectives (2-3 sentences)

- State the reason for doing the experiment.
- Describe the purpose and importance of the experiment.

Hypothesis (2-3 sentences)

- State what you think the outcome of the experiment will be.
- Explain why you expect this outcome.

Background (1-2 paragraphs)

- Provide any relevant background information including history, alternative methods, etc.

Materials

- List all of the materials used:
 - Chemicals: include the manufacturer, expiration date, and lot number
 - Equipment: include the model name and number, manufacturer
 - Safety Equipment

Methods (or Procedure)

- Write the procedure as you performed it.
- Make sure all of the major steps are included.
- Include any modifications you make to the protocol you were given.

Data

- Summarize all of your data in tables and/or graphs. You may want to include raw data in one table and summarize calculated data in another table.
- State all of your observations. Be detailed.

Data Analysis

- Show all of your calculations.
- List any unexpected results.
- Determine and record what your data means.
- Determine and record percent error and standard deviation, if applicable.

Discussion (1-2 pages)

- State your conclusion. Make sure that your data supports your conclusion!
- What was good about your experiment? Why?
- What wasn't good about your experiment? Why? (List sources of errors in your experiment. Discuss any unexpected results.)
- Does your conclusion support or refute your hypothesis? Why?
- What would you have done differently? Why? (State any recommendations you may have for the future. If you know of any additional experiments that might clarify your results, mention them.)

Bibliography

- Make a list of any outside references

***Always write in the third person. Do not use the words: I, we, my, our, etc.**